

BASIS FOR THE AMENDMENT

Claims 21 and 22 have been canceled.

New Claim 23 is supported at page 9, last paragraph.

No new matter is believed to have been added by entry of this amendment. Entry and favorable reconsideration are respectfully requested.

Upon entry of this amendment Claims 1-4, 6, 7, 9, 10, 12-20, 23 will now be active in this application.

REMARKS

Applicants respectfully request reconsideration of the application, as amended, in view of the following remarks.

The present invention as set forth in **Claim 12** relates to a decomposed substance of a urethane resin which is produced by

decomposing a urethane resin by

adding, in an extruder, a decomposing agent to said urethane resin to cleave urethane bonds in said urethane resin and capture amino groups generated by the cleaving of said urethane bonds, thereby obtaining a decomposed substance of said urethane resin;

wherein said decomposition agent contains at least one functional group selected from the group consisting of a carboxyl group (COOH), a salt of the carboxyl group, an ester of the carboxyl group and an acid anhydride of the carboxyl group (-CO-O-CO-).

Claim 18 relates to a recycled resin, which is produced by

adding, in an extruder, a decomposing agent to said urethane resin to cleave urethane bonds in said urethane resin and capture amino groups generated by the cleaving of said urethane bonds, thereby obtaining a decomposed substance of said urethane resin; and

then reacting the decomposed substance of the urethane resin with a compound that contains at least one functional group selected from the group consisting of an epoxy group and an isocyanate group;

wherein said decomposition agent contains at least one functional group selected from the group consisting of a carboxyl group (COOH), a salt of the carboxyl group, an ester of the carboxyl group and an acid anhydride of the carboxyl group (-CO-O-CO-).

Schneider, Broeck, Heiss ('577), Heiss ('824), Yang fail to disclose or suggest a decomposed substance of a urethane resin as claimed in Claim 12 and a recycled resin as claimed in Claim 18 in which **a decomposing agent is added in an extruder to a urethane resin to cleave urethane bonds in said urethane resin and capture amino groups generated by the cleaving of said urethane bonds, thereby obtaining a decomposed substance of said urethane resin.**

During the decomposition of urethane resins compounds are generated that act as catalysts during the formation of a recycled resin. These compounds must be inactivated. In conventional methods, a degradation process and a complex treatment process are used. In addition, aromatic amines are generated in the resulting decomposed substances, which are inappropriate for recycling. Moreover, the recycle rate is low. See page 2, line 16 to page 3, line 1; page 3, lines 2-25; page 4, last paragraph of the specification.

Notably, the inventors of the present invention have found that **a decomposing agent which has the ability to cleave the urethane bonds and capture amine groups** addresses the problems of the conventional methods, and the use of separate degradation and treatment steps is no longer required. See page 8, lines 10-24 of the specification. The present invention allows the capturing of the generated aromatic amines to take place simultaneously with the degradation of the urethane. **As a result, the decomposed substances obtained by the process of the present invention contain less aromatic amines than the decomposed substances obtained by conventional techniques.** See page 9, line 21 to page 10, line 3 of the specification.

Aromatic amines make the recycle process difficult, thus their amount should be kept low. In conventional processes they have to be deactivated in a separate process. However, the present invention allows the capturing of the generated aromatic amines to take place

simultaneously with the degradation of the urethane. See the paragraph bridging pages 2 and 3 and page 4, last paragraph of the specification.

Schneider discloses decomposing polyurethane resin using lactam and polyhydroxy compounds. See the abstract of Schneider. However, there is no disclosure or suggestion that a decomposing agent is added in an extruder to a urethane resin to cleave urethane bonds in said urethane resin and capture amino groups generated by the cleaving of said urethane bonds, thereby obtaining a decomposed urethane resin.

Broeck discloses methods for converting waste materials into liquid state. See col. 1 of Broeck. However, there is no disclosure or suggestion that a decomposing agent is added in an **extruder** to a urethane resin to cleave urethane bonds in said urethane resin and capture amino groups generated by the cleaving of said urethane bonds, thereby obtaining a decomposed urethane resin.

Heiss ('577) discloses a method of rapidly reducing the size and increasing the wettability of cellular polyurethane plastics so that they may liquefy faster (col. 1, lines 27-29). There is no disclosure or suggestion that a decomposing agent is added in an **extruder** to a urethane resin to cleave urethane bonds in said urethane resin and capture amino groups generated by the cleaving of said urethane bonds, thereby obtaining a decomposed urethane resin.

Heiss ('824) discloses a method of dissolving polyurethanes and/or polyureas (col. 1, lines 30-41). There is no disclosure or suggestion that a decomposing agent is added in an **extruder** to a urethane resin to cleave urethane bonds in said urethane resin and capture amino groups generated by the cleaving of said urethane bonds, thereby obtaining a decomposed urethane resin.

Regarding **Claim 18**, Heiss ('824) also fails to disclose or suggest the **reaction of the decomposed substance of the urethane resin with a compound that contains at least one**

functional group selected from the group consisting of an epoxy group and an isocyanate group.

Yang disclose the production of digested polyurethane which is reacted with cyclic, unsaturated anhydride. See the abstract of Yang. There is no disclosure or suggestion that a decomposing agent is added in an **extruder** to a urethane resin to cleave urethane bonds in said urethane resin and capture amino groups generated by the cleaving of said urethane bonds, thereby obtaining a decomposed urethane resin.

Regarding **Claim 18**, Yang also fails to disclose or suggest the **reaction of the decomposed substance of the urethane resin with a compound that contains at least one functional group selected from the group consisting of an epoxy group and an isocyanate group.**

Therefore, the rejection of Claims 12, 18, 21 and 22 under 35 U.S.C. § 102(b) as anticipated by Schneider ('749), the rejection of Claims 12 and 18 under 35 U.S.C. § 102(b) as anticipated by Broeck ('151), the rejection of Claims 12, 18, 21 and 22 under 35 U.S.C. § 102(b) as anticipated by Heiss ('577), the rejection of Claims 12, 18, 21 and 22 under 35 U.S.C. § 102(b) as anticipated by Heiss ('824), the rejection of Claims 12-14, 21 and 22 under 35 U.S.C. § 102(b) as anticipated by Yang ('167), are believed to be unsustainable as the present invention is neither anticipated nor obvious and withdrawal of these rejections is respectfully requested.

Further, the present invention as claimed in **Claim 1** relates to a method for decomposing a urethane resin, comprising:

adding, in an extruder, a decomposing agent to said urethane resin to cleave urethane bonds in said urethane resin and capture amino groups generated by the cleaving of said urethane bonds, thereby obtaining a decomposed substance of said urethane resin;

wherein said decomposition agent contains at least one functional group selected from the group consisting of a carboxyl group (COOH), a salt of the carboxyl group, an ester of the carboxyl group and an acid anhydride of the carboxyl group (-CO-O-CO-).

As a result of the method of the present invention, the obtained decomposed substance of said urethane resin contains a low amount of amines and is suitable for recycling the resin.

Further, Claim 12 relates to a decomposed substance of the urethane resin, Claim 15 relates to a method for producing a recycled resin and Claim 18 relates to a recycled resin.

Schneider, Broeck, Heiss ('577), Heiss ('824), Yang each in view of JP 2002-012699 fail to disclose or suggest adding, in an extruder, a decomposing agent to said urethane resin to cleave urethane bonds in said urethane resin and capture amino groups generated by the cleaving of said urethane bonds, thereby obtaining a decomposed substance of said urethane resin. As a result, the products of Schneider, Broeck, Heiss ('577), Heiss ('824), Yang each in view of JP 2002-012699 do not have the low amount of amine and high rate of recyclability of the present invention.

Therefore, the rejection of Claims 1, 2, 6, 7, 9, 10, 12, 15, 18, 21 and 22 under 35 U.S.C. § 103(a) over Schneider ('749) in view of JP 2002-012699, the rejection of Claims 1, 2, 6, 7, 9, 10, 12, 15 and 18 under 35 U.S.C. § 103(a) over Broeck ('151) in view of JP 2002-012699, the rejection of Claims 1, 2, 6, 7, 9, 10, 12, 15, 18, 21 and 22 under 35 U.S.C. § 103(a) over Heiss ('577) in view of JP 2002-012699, the rejection of Claims 1, 2, 9, 10, 12, 15, 18, 21 and 22 under 35 U.S.C. § 103(a) over Heiss ('824) in view of JP 2002-012699, the rejection of Claims 1-4, 9, 10, 12-14, 21 and 22 under 35 U.S.C. § 103(a) over Yang ('167) in view of JP 2002-012699, are believed to be unsustainable as the present invention is neither anticipated nor obvious and withdrawal of these rejections is respectfully requested.

The rejections of Claims 21 and 22 under 35 U.S.C. § 112, 1st and 2nd paragraphs are moot in view of the cancellation of these claims.

The obviousness type double patenting rejection of Claims 1-4, 6, 7, 10 and 12-22 over claims 1-22 of Serial No. 10/873,237 (now US 7,141,647) is traversed. Notably, the claims of Serial No. 10/873,237 fail to disclose or suggest that a decomposing agent is added in an **extruder** to a urethane resin to cleave urethane bonds in said urethane resin and capture amino groups generated by the cleaving of said urethane bonds, thereby obtaining a decomposed urethane resin. Thus, this rejection should be withdrawn.

The Examiner is requested to withdraw the provisional double patenting rejections over Serial Nos. 10/445,361 and 10/870,905 if they are the only issue remaining in one case and convert the provisional rejections in the other applications to a double patenting rejection. MPEP 822.01.

This application presents allowable subject matter, and the Examiner is kindly requested to pass it to issue. Should the Examiner have any questions regarding the claims or otherwise wish to discuss this case, he is kindly invited to contact Applicants' below-signed representative, who would be happy to provide any assistance deemed necessary in speeding this application to allowance.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon



Kirsten A. Grueneberg, Ph.D.

Registration No.: 47,297

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
NFO:KAG: